

# Lumbar Spine Discs Labeling Using Axial View MRI Based on the Pixels Coordinate and Gray Level Features

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**Abstract.** Disc herniation is a major reason for lower back pain (LBP), a health issue that affects a very high proportion of the UK population and is costing the UK government over £1.3 million per day in health care cost. Currently, the process to diagnose the cause of LBP involves examining a large number of Magnetic Resonance Images (MRI) but this process is both expensive in terms time and effort. Automatic labeling of lumbar disc pixels in the MRI to detect the herniation area will reduce the time to diagnose and detect the cause of LBP by the physicians. In this paper, we present a method for automatic labeling of the lumbar spine disc pixels in axial view MRI using pixels locations and gray level as features. Clinical MRIs are used for the training and testing of the method. The pixel classification accuracy and the quality of the reconstructed disc images are used as the main performance indicators for our method. Our experiments show that high level of classification accuracy of 91.1% and 98.9% can be achieved using Weighted KNN and Fine Gaussian SVM classifiers respectively.

**Keywords:** LBP · MRI · Lumbar spine disc · Disc herniation

## 1 Introduction

Low back is pain considered as the second most popular illness after the common cold. More than half of the world population were affected by the lower back pain once in their lives [1]. In the UK, the figure is higher with about sixty to eighty percent of its

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